

Simple Home Construction in the West Indies

A Guide for Good News Volunteers

Charles F. MacCarthy, MD Bud Lewens & George Nugent, Illustrators Fifth Edition ©2011, Revised October, 2011

> Good News Project, Inc. 1106 Fifth Street Wausau WI 54403, USA Phone: 715-843-5985 FAX: 715-843-5298 cfm@goodnewswi.com www.goodnewswi.com

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Charles F. MacCarthy, MD ©2011

This little booklet is based on the work of Good News Project volunteers over a 28 year period, from 1983 to 2011. Almost 300 homes have been constructed, and we have learned from experience each year. We hope this book will help future Good News volunteers, and others who may want to build similar simple, serviceable small houses.

Most Good News construction crews are a mixture of veterans, new volunteers, and local workers, with wide variation in experience and skill levels. This manual is not intended to stifle discussion and innovation, but to make it easier to plan a house building project, by providing a basic plan and approach.

Many veteran Good News carpenters will recognize their ideas in these notes. Hopefully, I have chosen their <u>good</u> ideas! Special thanks go to Tom Roovers and Pat Baumer, who drew up the first set of plans we used for construction, and to Abbot Jerry Tremel, Wellington Jeremy, Bob Brown, John MacCarthy, George Francois, Don Kirby, George Nugent, Mike Hase and many others who have helped in the evolution of our house plans.

Enjoy the experience!

1. You don't have to rush. Nobody will remember whether the house was built in three days, or five days, but everybody will appreciate a house that is well built and looks nice. They will be especially proud if they helped in any way with the construction, painting, landscaping, or decorating.

2. Its important to invite family members to help, although some prefer to watch from the sidelines. They can be carpenters, or carry wood, cook a meal, help paint, pick up nails, etc. Find a way for them to be useful, if they want to be!

3. Take time to get to know the people you are building for, and working with. Learn their names.

Errors and Omissions

I'll take full credit for these. Please let me know about them, and give me your suggestions for revisions, additions, or further details which might be helpful.

Chuck MacCarthy

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Safety

1. Think about safety in each step of construction. Discuss safety

before you start work each day. If a member of the crew gets an eye injury, steps on a nail, or falls and breaks a leg, it may take a long and painful trip to reach medical care. More serious injuries may require arrangements for air evacuation to another island, or to the United States.

2. Be prepared to deal with minor injuries, and know where you can get a telephone if you need to call for help.

3. Use eye protection when cutting and nailing.

4. Try to minimize climbing and the use of ladders by careful planning, prepainting, installing windows before erecting the walls, etc.

5. Let the younger, more agile members of the crew do the roof work. Many West Indians have had experience in installing and repairing galvanized roofs, and they like to demonstrate their expertise.

6. If you have a cut, a blister, or a puncture wound, and you think it might be getting infected - <u>it probably is!</u> Get treatment for it, before it gets well established, or spreads.

7. Pick up scrap lumber, bent nails and junk. Fill in the potholes in the ground around your construction site. (Our most serious injuries have occurred when volunteers have fallen while carrying building supplies.)

8. Remember that many crew members are not experienced in using power tools. Take time to teach and demonstrate safe procedures.

9. Be sure that any water you drink came "from the pipe", not from the roof, or from the stream.

10. Watch out for sunburn and dehydration, especially in first time volunteers.

11. Be careful with dogs and cats. Female dogs with new puppies can be very aggressive toward strangers.

Job Site Notes

- 1. Take garbage bags to the job site to bring garbage back for proper disposal. Wear gloves while you are picking up garbage and trash.
- 2. To minimize rain damage, bring two plastic tarps to the work site. Place tools, lunch boxes, backpacks, etc. on one tarp, to be covered by the second tarp during the frequent rain showers.
- 3. When you leave the work site for the night, be sure that tools and materials are safe from rain damage and theft. Unless good secure storage is available, this means bringing tools and loose lumber back to a secure central location.
- 4. Empty vehicles, store tools and materials, and clean painting equipment on return to your central location.

Building a House

Two Approaches to Building in the Caribbean

1. Build components in a central location, transport to site.

Some builders prefer to assemble and paint house components at a central site, and transport entire walls to the house site for assembly after a foundation has been built. This allows many volunteers to participate without actually going out to the house site. The main disadvantage is the problem of safely transporting and handling large and heavy assembled house components – entire walls. A large truck is required for transport, and many strong helpers are needed to move and erect the wall panels.

2. Cut and paint centrally, assemble on site.

Most teams use this approach. This allows many volunteers to participate in cutting and painting components, which are then transported to the house site for assembly. The entire house can be transported on a small pickup truck in two or three loads. The other advantage is that more volunteers are involved on site, with the chance to interact with family members and neighbors. Some teams build almost everything on-site.

Getting Started with a Building Crew

Direct some crew members to begin cutting studs and floor framing, and painting the studs, plywood, trim boards, and roof trusses when they are built. This will speed up construction, and get a large number of people busy while a smaller group builds a good foundation and floor system for the house.

Painting Notes

A good paint job enhances the appearance and durability of the house. Paint all plywood edges carefully. Remember that the people who will live *inside* the house will appreciate a bright, easy-to-keep-clean interior.

Home Dimensions & Foundations

Good News Project houses are 12' by 16'. Please do not offer, and do not agree to build a larger house. If we build a larger house for one person, others will become unhappy with our previous houses, and future tenants will all want the larger version. Variety in sizes makes it impossible to budget for building expenses or to buy a standard package of components for each house. There are many people who need and appreciate our simple 12' x 16' houses. Others should just be told that we can't meet their needs at this time.

Floor Systems

In many areas, local groups will prepare the work site and build a foundation. This is a great time saver <u>if</u> the local workers understand the importance of accuracy in determining the dimensions and leveling the floor system. Make sure that local carpenters and masons understand the importance of exact dimensions. A foundation that is not square and level, or not built to exact measurements, is a hindrance, not a help.

Concrete floors

The durability of concrete is attractive, and is worth the cost and effort involved, if local workers begin preparations early enough to complete the floor before we begin construction. Remember that many houses are built by local labor without the use of a level or square, or even a tape measure. Be patient in explaining and demonstrating the value of careful measurements and leveling.

Concrete floors should be made about ¹/₄" *smaller than* 12' x 16", so the exterior plywood of the house can extend down over the floor to keep rain out. Experienced local builders are able to lay concrete blocks and pour concrete floors without benefit of a cement mixer. A few times, we have built a house on a rough concrete block foundation and then helped pour a concrete floor within the walls of the completed house. Bolts or "rebar" tie-downs should be inserted in the foundation to tie the walls to the foundation.

Hurricane Note: Bruce Abbott, engineer, says the uplift force of an 88 mph wind is 30 pounds per square foot of roof - probably enough to lift any house. Tie-downs won't save a house from a direct hit, but on the fringes of a storm system, the tie-downs might spell the difference between retaining and losing the house to the wind.

Wooden Floors

Support for wooden floors may be provided with block or poured cement pillars, treated 4x4s, or round poles cut from the jungle.

Concrete Block Pillars

On level ground (rarely found) simple corner pillars and supporting pillars can be made from a few blocks on a concrete pad set a few inches below ground level. Be careful handling block, and use steel reinforcing bars if more than two blocks in height are required, as the local block is usually fragile and crumbles easily. Place these pillars with outside measurements of 12' 4", and 16' 4". In this situation, larger is better than smaller, as the corner pillars need to support the wooden floor frame. If the pillars are smaller than 12' x 16', they may not support the corners. Careful measurements and leveling are necessary. Six pillars are needed, with three under each 16' edge of the floor. Two more pillars, $5 \frac{1}{2}$ " shorter than the others, are placed to hold the 16' center support for the floor.



Wooden posts

Some houses are built with simple posts cut from nearby trees, and appear to last quite well. Treated 4x4 posts or round fence posts also work well, and are easier to work with. This system is practical for sloping sites, if done carefully. It is best to build the perimeter of the floor system, and install some of the joists on the ground, and then lift it up to place it on the posts.



Building The Wooden Floor

1. Select two 2x6 exactly 16' long.

2. Cut 9 floor joists of 2x6 11'9" long (141")

3. Assemble the floor structure with 3 $\frac{1}{2}$ " galvanized nails, using joist hangers if desired, and placing joists on 2' centers. (Number 5 joist, in the center, has to be accurately placed on center to receive the ends of plywood flooring)

4. If you have to lift the floor frame above knee high, you can leave out some of the joists to save weight until after you raise the floor into position.



5. If you are using wooden posts: Measure, cut and place the shortest post first. (Which corner of the house will be closest to the ground when the floor is leveled?) Cut the post to provide 18 - 24" below the ground level, and 6 - 12" clearance above ground. Notch the post to provide solid support for the 2 x 6 floor perimeter. After tamping the bottom of the hole with the 4 x 4 end, put some gravel, or a flat stone in the hole to support the post.

6. Support the floor frame on temporary 2 x 4, or 4 x 4 posts or other material while you carefully level the frame, as each remaining "corner" post is installed. Note that the "*corner posts*" *are not actually placed under the corner* - but are placed 12 - 18" from the end of each 16' 2 x 6. This means you should prepare each post hole, tamp the bottom, place the gravel or stone in the hole, THEN mark the post for notching as the frame is being held in level position. (If the corners are left free, it is possible to add cement pillars later.)



7. **Critical Step**: Square the frame, checking for equal diagonal measurements from corner to corner. Firmly tamp the soil into the hole around each post.

8. Recheck square and leveling, then install remaining posts, and a center 16' 2×6 under the floor system.

9. Install any remaining 11' 9" floor joists.

10. Install plywood deck material, (4' x 8' x $\frac{3}{4}$ ") using the first sheet to further square the frame. Use 2 $\frac{1}{2}$ " galvanized nails. "Sinkers" hold better than common nails.

- 11. You should now have a level and square floor exactly 12' x 16'. Take time to congratulate the crew!
- 12. You can lay floor tile or vinyl "carpet" (roll vinyl) before putting up the walls. This saves time in tile installation, and protects the wood flooring during construction. Protect the tile overnight with a heavy plastic sheet, to allow the adhesive to set. Leave the plastic in place until you have the walls up, and interior touchup painting done, then trim along the interior wall with a knife and remove the plastic.

Walls

With the future residents, plan placement of doors, windows and partitions *before* you start building walls. This discussion might take a while, involving family members and neighborhood "experts", but it is better than building the walls, and *then* finding out where they want the <u>two doors and six windows</u>. (Don't offer more than two and six).

For a 12' x 16' house, you will need two "stud walls" (without exterior plywood) exactly 16' long, and two walls 11' 5" long which will fit between the longer walls to make a finished 12' end wall. (Assuming the width of the wall stud "2 by 4" is actually $3 \frac{1}{2}$ ".) Remember that the exterior plywood on the "short" walls must extend $3 \frac{1}{2}$ " beyond each end to cover the corner stud in the "full length" wall at the corner.

Wall Height: The exterior plywood (T111) of the wall should extend down over the edge of the floor system to protect it from weather. The actual height of the wall will vary with the type of floor system. To calculate the height of the wall above the deck, subtract the thickness of the floor from the 8' length of the plywood. A floor made with a $\frac{3}{4}$ " plywood deck on a 2x6 frame will actually measure about 6 $\frac{1}{4}$ " thick. The wall can extend 89 $\frac{3}{4}$ " above the deck. (96"-6 $\frac{1}{4}$ ") Since the top and bottom "plate" 2x4 are each 1 $\frac{1}{2}$ " in thickness, <u>the vertical studs will be 86 $\frac{3}{4}$ " long.</u>





Note the second drawing, showing wall dimensions to use with a concrete slab foundation. The wall can be a little taller, since the T111 doesn't have to protect the edge of the wooden platform. It should, however, extend down below the level of the floor, to keep rain water off the floor.

Wall Layout

Both 12' and 16' walls can be made with two windows, or one window and one door. (Large detailed plans for these are available.) The final position of the door (right or left) depends on which side of the wall is covered with the exterior plywood T111. Windows and doors look best with all the tops at the same level - usually 78" above the floor.











Before you begin laying out your walls:

- Measure the actual size of the "2 by 4" being used for wall plates (the bottom and top pieces of wall framing.) If the actual dimension is 3 5/8", 3 ³/₄" or more, which may be true if the lumber is treated, wet or "rough cut", this will effect your measurements.
- For example, if the "short wall" is 11' 5" long as indicated in the drawings, but your "long wall" plates are actually 3 ³/₄" wide, rather than 3 ¹/₂" as planned, the total width of the house will be 12' ¹/₂", not the desired 12', and your roof trusses will not fit properly.
- 3. You can avoid this problem by shortening the "short wall" to 11' 4 ¹/₂". If you don't do this, you will have a problem installing the roof trusses, which are designed to span 12'.

For the "long walls", select straight $2 \times 4s$ for the top and bottom plates, and lay them side by side on the floor to mark the position of the 2x4 studs, on 24" centers. It is most important that the studs at the 4', 8' and 12' points are accurately centered, so you will be able to nail the edges of the exterior T111 plywood to the stud. You will have to move one of the *other* studs 6" to allow for a 30" doorway.

The "short" walls are a little tricky, as you have to remember the $3\frac{1}{2}$ " plywood overhang at each end when laying out the stud centers, but you still need a stud at each joint between plywood sheets. Here's a suggested method to set up the "short" wall:



1. Select two 2 x 4s, each 11' 5" long, or adjusted as mentioned above.

2. Lay a scrap of 2 x 4 (the same width as your "long wall" plates) flat, and butt the ends of the long pieces against it

3. Measure and mark 2', 4', 6', etc, <u>measuring from the outer edge of the</u> <u>scrap</u>, which is then set aside.

- 4. When you put on the siding, use the same scrap of 2 x 4 again to get the proper plywood overhang at the ends.
- 5. Once again, the studs at the 4' and 8' positions need to be accurately centered. Move one of the *other* studs if needed for a wider door or window opening.

Door and Window Openings:

The most difficult part of this is making sure you understand where the occupants want these, as mistakes are difficult to correct. Try to be clear about occupant desires before you start cutting.

For window shutters made of the plywood cutout, window sills at 37" above the floor look about right. (The bottom of the cutout is at $35 \frac{1}{2}$)

Cutting door and window openings:

- 1. Put the whole wall together, using nails or screws to fasten the T111. Do not nail T111 onto the bottom plate in door area.
- 2. Lift the wall to a vertical position.
- 3. Using a <u>long drill bit</u>, or a nail, make a hole at each corner of the window opening, right next to the stud, and at the top & bottom of the door opening.
- 4. Place the wall flat on the floor again, and draw "dot to dot" lines with a chalk line or straight-edge, using the holes as corners.
- 5. Cut out carefully. Carry the door cuts all the way to the bottom of the T111, so the door protects the floor edge when closed.

Windows

NEW: If Aluminum windows are to be used, measure them carefully before cutting window openings. Most aluminum windows will fit between studs on 24' centers, but some are a little wider, so one stud will have to be moved accordingly.

Aluminum windows are mounted from the outside, with a bead of waterproof caulking to seal them to the exterior T111 (which should be painted prior to installation of the windows.) It works well to install the windows and touch up the exterior paint *before* erecting the wall – no ladders needed!

(IF NOT USING ALUMINUM WINDOWS) There have been many variations on window design. Some have been done without any trim, which looks very plain, and doesn't protect plywood edges very well. Most have had a surrounding trim of 1x3 or 1x4, painted a contrasting color to liven up the exterior. The window designed by Don Kirby has proven to be easy to build and good looking. It uses a 2x4 header, and 2x6 sill. Window sills are important to keep water out of the cut edge of the T111 below the window. Without a sill, water eventually enters the interior of the plywood, and ruins the section of wall under the window. And.... sills are also nice to lean on while you watch the passing scene!



"Kirby Window"

Insert prepared 2x6 sill, tilted slightly to drain.

Trim bottom of cut-out 1 3/4", and one side $\frac{1}{4}$ " to allow for thickness of the 2x6 sill, and to make fitting the window into the opening easier.

Install trim on the outside face of cutout, using 3/4" dry wall screws *from inside*, with trim overlap of about $\frac{1}{2}$ " to $\frac{3}{4}$ " on top and two sides.

Place this new shutter in the opening, and install outside trim around it.

Mount the hinges.



Doors



These need to be stiffened and strengthened with 1x4 or 1x6 trim strips. They can be built using the same strategy as the Kirby window. That is, placing the trim on the outer surface of the door, with a $\frac{1}{2}$ to $\frac{3}{4}$ " overlap to act as a stop, and then trimming around the door before mounting hinges. If you plan to saw it into a "Dutch" door, use a 1 x 6 trim piece across the middle of the door. Use an extra 1 x 6 vertically down the middle if you plan to make it into two "French" doors.

Note: Remember to saw a "Dutch" door at an angle. The top overlaps

the bottom, to keep it closed, and to keep water out. ---->



Typical French Door Style Assembly With Trim



Cross Section of a Dutch Style Door Showing the Angle Cut Thru the Center Trim

"French" Door: This is most useful when houses are so close together that a full-sized door can't be opened without striking the other house, or obstructing a pathway between the houses.

On steeply sloping sites, it is easier, and <u>safer</u>, to nail on the <u>painted</u> exterior plywood, and to install the doors, windows and trim <u>before</u> you erect the wall. This avoids a lot of acrobatic maneuvers, and saves a great deal of time. Try to avoid the need for makeshift ladders.

Attach the walls to the floor with 4" nails through the bottom 2x4 plate of the wall, and through the deck into the perimeter joist.

Roof Trusses

Roof trusses are very helpful in building a roof that will shed rain in great quantity, sustain moderately high winds, provide some ventilation - and result in a nice appearance to the entire structure. High roof pitches and wide overhangs are needed to provide weather protection from frequent heavy rains and high winds.



Build trusses on a flat surface - like the newly built floor for the house, before you put up the walls. You can build a "jig" to make a series of trusses with identical dimensions, or build one truss, and then build each succeeding truss right on top of it. It is important that these be as nearly identical as you can make them. On this diagram are dimensions for trusses to span a 12' house. You will need five trusses as illustrated.

Mike Hase has made several suggestions for preparing trusses that fit well and are easier to install:

- 1. Cutting the horizontal member of the trusses with an angled cut at each end results in too much variation in actual finished length of this important part.
- 2. Cut the horizontal member with a square cut at exactly 12' length. Then mark $\frac{1}{2}$ ' up from the bottom on each end before making the cut at 22 $\frac{1}{2}$ degrees.
- 3. The little $\frac{1}{2}$ ' step at each end will lift the outer end of the angled top member of the truss slightly, allowing it to clear the top edge of the T111 on each side.
- 4. The $\frac{1}{2}$ " step also gives the installer a visual reference point to line up with the outer edge of the wall framing on each side of the house.

5. Whether you are using a jig or building trusses one on top of the other, mark one end of each truss as you complete assembling it. (Because the trusses are usually not perfectly symmetrical.) Keep all the marked ends pointing in the same direction as you complete the next steps.



6. Cover one side of each end truss with T111. Here is a simple method to cut the T111 for the end trusses, suggested by Bernard Louis in St. Lucia.

The plywood exterior sheeting should extend about 1.5" below the bottom of the truss member, to lap over the sheeting on the end of the house, giving a waterproof joint. These end trusses may be held in place by screws or nails through this overlap, into the supporting end wall top plate. The other trusses should be fastened with metal "hurricane straps", or "toe nailed" into the top plate, if hurricane straps are not available.





7. After the end trusses are covered with T111 and all the trusses are painted, stack 5 of them as a set, aligning them as carefully as possible. Now you can see how nearly identical they are, if the have been carefully made.



8. On the top edge of the two end trusses, measure and mark 4.5", 30" and 60" from the peak and place an "X" on the side of the line closest to the peak.



Using a straight edge, draw a line at each mark on all 5 trusses. These lines represent the lower edge of each purlin.



After the 18' purlins are painted, stack a set of 8 of them and mark them at 1', 5', 9', 13' and 17' from one end of the top and bottom piece in the stack. Using a straight edge, draw a line on all 8 purlins at each mark. When the purlins are installed, these lines need to be centered on the tops of the trusses.

To position the lowest purlin on each side of the roof, place a straight edge on the end of the truss, and slide the purlin down to meet it.



Using this method, the purlins can be accurately and rapidly installed without further need for measurements by the installer on a ladder! The important measurements and marks have all been made by a person with both feet on the ground, access to this manual, and time to think!

Metal Roofing

The "galvanized" roofing available in the West Indies is quite heavy, and has a wavy, "sine wave" shape in cross section. It makes a good roof, IF the supporting structure is properly designed, and IF workers are very careful walking on the roof during construction, <u>stepping only where the roof is supported</u>.

"Galvanized" materials must be handled with care at all times. They have dangerously sharp edges, and murderous corners. A falling or sliding sheet of galvanized is like a giant guillotine. WEAR GLOVES AND BE CAREFUL !

The metal "galvanized" sheets will be supported by four strips of wood called "purlins", on each side of the peak. Use a 2 x 4 for these. It is much easier to <u>measure and mark</u> the tops of the trusses before installation to get these purlins in the right position. You may not have boards long enough to make full-length purlins, and the calculations and cutting to make them out of two or more pieces are also done more easily on the ground.

Measure the galvanized sheets, and calculate the total number and actual span of overlapped sheets before you decide on the length of your purlins - which is the length of your roof. Overlap "two humps", with the edge of the top sheet pointed downward into a valley of the underlying sheet. Allow at least 12", and preferably 15 -18" of roof overhang on each end, with the galvanized extending about 2" beyond the end of the purlin, to allow room for the fascia board.

One of the worst trouble spots in a metal roof is along the peak, which is covered with a "ridge cap" - a strip of metal that runs along the peak line, extending down each side 8 - 12". <u>The ends of the long pieces of galvanized roofing have to come almost to the peak, so the ridge cap overlaps them as much as possible. Otherwise, a strong wind will drive rain water up the roof, under the ridge cap, and into the house at the <u>peak</u>. In a windy location, people stuff newspaper or rags wadded up with black roof mastic into each valley in the galvanized, up under the ridge cap, to keep the water out.</u>

Roofing nails should have a rubber washer on them to keep rain out of the nail hole. Be careful in nailing, because you will create a potential leak every time you miss the target board when nailing through the galvanized into the purlin. <u>Nail through the peaks</u>, not the valleys.

Remember: It's easier and safer to paint the fascia, or "dashboards" which cover the truss ends, and the corner trim for each corner of the building, before installing.

In Dominica: Use a 1 x 8 painted trim board, notched out to accommodate the trusses, along the top of the 16' sides of the house to protect the opening between the top of the walls and the roof. Otherwise, wind and rain do blow in through this gap.



Interior Design and Partitions



Discuss the interior again with the future occupants to be sure you understand their vision of the interior. We usually divide the house into two 8' x 12' rooms, and often subdivide one end into two 8' x 6' bedrooms. Sometimes the location of the house, or the desires of the occupants will lead to other designs, with a narrower long "living room" and two larger bedrooms. The interior walls can be framed with 2' x 2' lumber, and surfaced with $\frac{1}{4}$ " hardboard or plywood.



Beds: If the occupants don't have beds, you can make simple platform beds with 2' x 4' frames and plywood decks. We often make bunk beds for children. These should be designed on site to fit the bedrooms you have built. It saves lumber if one side of the bed is fastened to the wall, so no legs are needed on that side.

Stairs



Use treated 2 x 12 lumber to make a set of stairs, if the floor of the house is more than one comfortable step above ground level. Measure the height above ground, and plan for about 7 to 8" step height. Layout of stairs is done easily with a large square, drawing a series of steps on the 2 x 12, with 7 to 8" step height or "rise", and 10 1/2" step depth or "run". If the doorway is 30" wide, a 32" step width is sufficient, and doesn't need a center support. You may have to add an extra post to support one side of the stairs.

"Bob Brown Block Steps": A very durable step system can be made by piling cement blocks with the holes facing upward. Insert a small piece of "rebar" to tie the tiers together, then fill the holes with cement, producing a smooth step surface at each level.

Finishing Touches

- 1. Try to do something to make the house special. Put up hooks for clothes, a closet pole with a shelf, a little shelf for a favorite picture, bunk beds for the kids, etc.
- 2. Stretch a wire, or a piece of elastic nylon cord between nails as a "curtain rod" for each window. We can always find curtain material in our boxes of donated supplies.
- 3. Install hook and eye or other secure closure system for windows and doors.
- 4. A hasp and padlock for the door are much appreciated.
- 5. Build a ramp for a disabled family member.
- 6. Dig a drainage ditch to divert water around the house on a hillside.

House Blessing

We have a tradition of gathering family members and Good News volunteers, sometimes with the local pastor or service club representative, and other interested parties, for a little ceremony to celebrate the completion of the house. It's a good time to take some pictures, deliver the "house kit" of items for the family, and allow Good News volunteers who weren't directly involved in the construction to see the house and meet the family.

A small brass plaque is placed on the house, and the local pastor, or a member of the group will lead a brief prayer for the family. This is a good time to present the key to the lock on the front door. Some teams prepare a basket of goodies as a housewarming gift.

A Few Words About Tools

We have had very little problem with theft of tools, thanks to the honesty of most workers and neighbors. But - make it obvious that you are keeping track of your tools, and pack them carefully when you leave the work site. Think about security for tools and supplies.

Some helpers and watchers will ask for tools. In general, we say, "No, we need the tools for the next house". At the end of a project, it is OK to give a small tool, like a tape measure or hammer (in private) to a person who has shown up to help regularly, but be discrete about it. We've learned to avoid most giveaways, after near riots when volunteers have given away pencils, balls, or other items. If you give three kids a stick of gum, you will soon have 30 kids looking at you with big sad eyes, and jostling for position in line for the next give-away.

Teams in Dominica have been especially effective in recruiting and retaining local volunteers with annual recognition and thanks, and with tool belts, hammers, tape measures and other small gifts to faithful local workers.

Photographs

Nearly all of our houses are sponsored by donors who contribute the cost of materials. They enjoy seeing photographs of the house, and learning about the people who will live in the house they donated. We try to give these donors a series of photos, showing the previous house, and the appearance of the new house, if possible. Try to get a photo of all of the family members, and make a list of their names. Get a photo of the entire building crew, with the house in the background. Get a photo of the kids sitting in the doorway, or waving from a window, and one of the mother holding her baby, or a grandmother and child. These are memorable events for the family, for the volunteers, and for the donors. Be sure to send these photos to the office, to be framed and forwarded to the donors. The new occupants also appreciate getting photographs.